will say you never saw *Saturn* of that figure. And the eye may sometimes be trusted rather than the micrometer. Recollect, too, that the ellipticity of *Jupiter* deduced from the Greenwich observations from 1840–1848, is little more than *half* what Mr. Mr. Main's observations assign to *Saturn*, viz. $\frac{1}{17{\cdot}9}$.

"*Wateringbury, Nov.* 30, 1852."

Sur les Dimensions de Saturne, par M. Otto Struve.

(*Extrait des Mém. Acad. Scien. St. Pétersbourg*, tom. v.)

In this memoir M. Struve has given the results of a limited series of micrometrical measures of *Saturn* and his rings, which he executed at Pulkowa with the great refractor in the autumn of the year 1851. He also examines some observations of preceding astronomers, tending to throw light upon the physical constitution of the rings.

The obscure ring was very distinctly visible on these occasions. M. Struve perceived that at the extremities of the *ansæ* it was divided into two parts by a dark line. He is of opinion that the division extends throughout the entire circuit of the ring. The gradation of light from the ancient bright rings to the obscure ring was very abrupt and striking; but he was unable to discover the slightest trace of a division between the exterior edge of the obscure ring and the interior edge of the inner bright ring. The breadth which he assigns to the obscure ring (2″·035), agrees almost exactly with that which Dr. Galle, of Berlin, obtained in 1838, and with a similar measurement of Mr. Dawes in 1851. (*Monthly Notices*, vol. xi. p. 52.)

M. Struve next proceeds to show that the observations of various astronomers anterior to the year 1838, afford unequivocal indications of the existence of the obscure ring. He remarks that the early observers generally make mention of a dark belt (termed the equatoreal belt) which was seen passing across the body of the planet *immediately contiguous* to the inner edge of the interior bright ring. J. Cassini showed in 1715, that from its slight curvature the equatoreal belt could not be situate close to the surface of the planet. The observations of Hadley, a few years later, would seem to establish almost beyond doubt the identity of the equatoreal belt with the obscure ring of modern astronomers. In 1723 he remarked that the dusky line which in 1720 he observed to accompany the inner edge of the ring across the disc, *continued close to the same, though the breadth of the ellipse had considerably increased since that time.* (*Phil. Trans.* 1723, No. 378.) He asserts, moreover, in reference to the hypothesis of the belt being produced by the shadow of the ring upon the planet, that when he considered the situation of the sun with respect to the ring and the planet, he found that the belt could not arise from such a cause.

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As confirmatory of the same hypothesis, M. Struve remarks that the projection of the obscure ring upon the body of the planet agrees with the position assigned by the earlier observers to the equatoreal belt, and that no trace of the latter is visible upon the planet in the present day. He therefore arrives at the definitive conclusion that the obscure ring has existed around the planet at least since the time when telescopes were first constructed of sufficient optical power to exhibit the belts upon his disc.

The most serious objection which appears to M. Struve to offer itself to this hypothesis is founded on a remark made by Maraldi in 1715, to the effect that, during the disappearance of the ring in that year, the equatoreal belt continued still to be visible. If, indeed, that phenomenon be attributed to the projection of the obscure ring upon the body of the planet, it is difficult to imagine how it could have been perceptible on the occasion of the passage of the sun through the plane of the ring. M. Struve suggests as a probable explanation of this fact, that the obscure ring may be considerably thicker than the bright rings. The phenomenon, if sufficiently established, might perhaps serve to strengthen Mr. De la Rue's hypothesis of the obscure ring being situate in a different plane from that of the bright rings. It is so far confirmatory of the observation of Maraldi that M. Schmidt, of Bonn, perceived an obscure belt across the equator of the planet on the occasion of the passage of the sun through the plane of the ring in the year 1848 (*Ast. Nach.* No. 650). Future observations made during the disappearance of the rings can alone place the existence of the anomaly beyond all doubt.

The breadth of the space which separates the inner edge of the interior bright ring and the body of the planet, having exhibited a considerable discordance, as measured by himself in 1851, and by his father in 1826, M. Otto Struve was induced to institute a careful examination of the various measurements of preceding astronomers relative to the dimensions of the planet and the rings. The conclusion at which he arrived on this subject is somewhat curious. By a comparison of the micrometrical measures of Huyghens, Cassini, Bradley, Herschel, W. Struve, Encke and Galle, with the corresponding measures executed by himself, he found *that the inner edge of the interior bright ring is gradually approaching the body of the planet, while at the same time the total breadth of the two bright rings is constantly increasing.* It may be remarked, that the earlier measures employed in this comparison are founded upon certain assumptions relative to the effects of irradiation. They cannot, therefore, be regarded as altogether trustworthy.

In the concluding part of his memoir, M. Struve examines whether the two bright rings participate in an equal ratio in the enlargement of breadth which he found them to be constantly undergoing when considered as one appendage. He infers, from a comparison similar to that instituted in the previous case, *that, during the interval which elapsed between the observations of J. D. Cas-*

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sini and those of Sir William Herschel, the breadth of the inner ring had increased in a more rapid ratio than that of the outer ring. The subsequent measures seem to indicate a reversal of this process.

The view of *Saturn*, given in the present Number, has been carefully drawn to scale and engraved by Mr. Warren De la Rue. The *principal* dimensions are taken from the *Nautical Almanac*, so far as they extended. Mr. De la Rue suggests that the data should include the major and minor semi-axes of the ball of the planet; the semi-axis minor of the dark ring; and the semi-axes of the divisions, according to the best authorities. His opinion is, that the large and fine telescopes which are now in use would enable a careful observer with a practised eye to fill up, and even to correct, the representation of micrometrical measures, and that, if the data for delineating *Jupiter* were given, his figure might probably be corrected by comparing the representation with the planet itself, seen under the most favourable circumstances.

Mr. De la Rue proposes to unite in one sketch the phenomena of *Saturn*, which have been seen by MM. Dawes, Lassell, and himself.

Professor Chevallier finds from a comparison between his ephemeris of *Hygeia* and observation that the errors alter very slowly; they are as follows :—

	Computed—Observed.		
	R.A.	N.P.D.	
1852.		°	
Oct. 24	−30·54	+27·6	
Nov. 2	30·87	31·5	Cambridge Meridian
30	32·08	48·1	
Dec. 2	−31·96	+50·9	

He has, therefore, thought it better, " instead of attempting to correct the elements from partial observations, to compute accurately the planet's places from the same elements, during the entire period of its present appearance."

The ephemeris has been printed by the Professor, who has had the kindness to send copies for distribution to the Royal Astronomical Society.

BIELA'S COMET. *Ast. Nach.* No. 836, p. 327.

The following and southern portion of Biela's comet was observed at Cambridge on Sept. 8, 16, 21, 1852. Professor Challis finds that the Roman observations of August 25, 27, 28, and Sept. 1, as well as all the Cambridge observations, belong to the *southern* and *following* portion. The observation of Professor Secchi on Sept. 15, and the Berlin observations of Sept. 17, belong